

CLAIMS

Having thus described our invention, what we claim
as new and desire to secure by Letters Patent is as
5 follows:

1. A method of at least one of assigning and reusing frequencies between one or more communication systems, comprising the steps of:
 - 10 configuring a first satellite spot beam having a first set of frequencies associated therewith and comprising a first substantially central portion and a first plurality of subareas, each of the first plurality of subareas extending substantially from a periphery of the first substantially central portion to substantially near a circumference of the first satellite spot beam;
 - 15 configuring a second satellite spot beam having a second set of frequencies associated therewith and comprising a second substantially central portion and a second plurality of subareas, each of the second plurality of subareas extending substantially from a periphery of the second

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central portion to substantially near a circumference of the second satellite spot beam; configuring at least one terrestrial cell that at least partially overlaps the first satellite spot beam having a third set of frequencies associated therewith; and

5 at least one of assigning, reusing and borrowing, by the terrestrial system, at least one of a portion of the second set of frequencies and a portion of the first set of frequencies used in the first central portion, responsive to predetermined criteria associated with the third set of frequencies, including at least one of assigning, reusing and borrowing at least one of the second set of frequencies when the second set of frequencies are at least substantially

10 geographically distant from the first satellite spot beam.

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20 2. The method of claim 1 wherein the first plurality of subareas are substantially equal sized cells having a first size and the second plurality of subareas are substantially equal sized cells having a second size.

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3. The method of claim 2 wherein the first size and the second size are approximately equal.

4. The method of claim 1 wherein the second set of frequencies are substantially distant from the first satellite spot beam when they are at least one of assigned, reused and borrowed for use in those first plurality of subareas not sharing a common boundary with the second satellite spot beam.

5. The method of claim 1 wherein the first set of frequencies used in the first central portion comprise at least one of those frequency sets respectively associated with satellite spot beams directly adjacent to the first satellite spot beam.

6. The method of claim 1 wherein said step of assigning, reusing and borrowing is based on prioritization rules.

7. The method of claim 6 wherein the prioritization rules include dynamic load and capacity constraints of cells that frequencies are taken from.

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8. The method of claim 1 wherein a subscriber terminal positioned within the first central portion can be assigned, reuse and/or borrow use any of the respective set of frequencies associated with the at least one second satellite spot beam.

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9. The method of claim 1 wherein a subscriber terminal positioned within the first central portion can be assigned, reuse and/or borrow use any of the respective set of frequencies associated with any spot beams adjacent the first satellite spot beam.

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10. The method of claim 1 wherein a subscriber terminal positioned within a subarea of the first spot beam not sharing at least a portion of a common boundary with the second satellite spot beam can be assigned, reuse and/or borrow any of the second set of frequencies associated with the second satellite spot beam.

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20 11. The method of claim 1 wherein the predetermined criteria is at least one of load balancing, maintaining a reserve of frequencies, and received signal strength interference.

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12. The method of claim 1 further comprising the steps of:

configuring a second terrestrial cell that at least partially overlaps the second satellite spot beam having a fourth set of frequencies associated therewith; and

5 at least one of assigning, reusing and borrowing, by the second terrestrial cell, at least one of the first set of frequencies and the frequencies used in the second central portion, responsive to predetermined criteria associated with the fourth set of frequencies, including at least one of assigning, reusing and borrowing at least one of the first set of frequencies when the first set of frequencies are at least substantially

10 15 geographically distant from the second satellite spot beam.

13. The method of claim 1 wherein the first central portion and the second central portion comprise approximately twenty five percent of the area covered by the first satellite spot beam and the second satellite spot beam, respectively.

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14. The method of claim 1 wherein the first set of frequencies and the second set of frequencies comprise a plurality of paired uplink and downlink frequencies.

5 15. The method of claim 14 wherein a downlink frequency of a frequency set is used in a first subarea of the first spot beam, and wherein a corresponding one of the uplink frequencies is reused in a second subarea of the first spot beam.

10 16. The method of claim 1 wherein the area of coverage of a spot beam comprises an area having a radius substantially equal to a distance from a center of the spot beam having a substantially maximum signal strength to a distance from the center of the spot beam where the signal strength of the spot beam is attenuated by approximately 3 dB.

15 17. The method of claim 1 wherein an area of coverage of at least one of a spot beam and a terrestrial cell comprises an area corresponding to a bit error rate in the range of at least one of 10^{-2} to 10^{-3} for voice and 10^{-5} to 10^{-6} for data.

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18. The method of claim 1 wherein the number of subareas is equal to a number of spot beams comprising a cluster minus one.

5 19. A method of making a telephone call using a satellite-terrestrial communications system that at least one of assigns and reuses frequencies between a first satellite spot beam and a second satellite spot beam, comprising the steps of:

10 a first user using a subscriber terminal to dial a telephone number within an area of a first terrestrial cell associated with a first satellite spot beam having a first set of frequencies associated therewith, the first satellite spot beam comprising a first substantially central portion and a first plurality of subareas, each of the first plurality of subareas extending substantially from a periphery of the first substantially central portion to substantially near a circumference of the first satellite spot beam;

15 determining because of at least one of unavailability of the first set of frequencies or weak signal strength that a connection cannot be established, using the first set of frequencies, with a

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communications device having the dialed telephone number associated therewith; configuring a second satellite spot beam having a second set of frequencies associated therewith; and establishing a connection between the subscriber terminal and the communications device by at least one of assigning, reusing and borrowing, by the first spot beam, at least one of the second set of frequencies, responsive to predetermined criteria including at least one of assigning, reusing and borrowing at least one of the second set of frequencies when the mobile terminal is substantially geographically distant from the second satellite spot beam.

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20. A method of at least one of assigning and reusing frequencies, comprising the steps of:

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configuring a first communications area having a first set of frequencies associated therewith and comprising a first substantially central portion and a first plurality of subareas, each of the first plurality of subareas extending substantially from a periphery of the first substantially central

portion to substantially near a circumference of.

the first communications area;

configuring a second communications area having a
second set of frequencies associated therewith and

5 comprising a second substantially central portion
and a second plurality of subareas, each of the
second plurality of subareas extending
substantially from a periphery of the central
portion to substantially near a circumference of
10 the second communications area;

configuring at least one third communications area
that at least partially overlaps the first
communications area, having a third set of
frequencies associated therewith; and

15 at least one of assigning, reusing and borrowing, by
the third communications area, at least one of a
portion of the second set of frequencies and a
portion of the first set of frequencies used in the
first central portion, responsive to predetermined
20 criteria associated with the third set of
frequencies, including at least one of assigning,
reusing and borrowing at least one of the second
set of frequencies when the second set of
frequencies are at least substantially

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geographically distant from the first satellite spot beam.

21. The method of claim 20 wherein the first
5 plurality of subareas are substantially equal sized cells having a first size and the second plurality of subareas are substantially equal sized cells having a second size.

10 22. The method of claim 21 wherein the first size and the second size are approximately equal.

15 23. The method of claim 20 wherein the second set of frequencies are substantially distant from the second communications area when they are at least one of assigned, reused and borrowed for use in those first plurality of subareas not sharing a common boundary with the second communications area.

20 24. The method of claim 20 wherein the first set of frequencies used in the first central portion comprise at least one of those frequency sets respectively associated with communication areas external to and directly adjacent to the first communications area.

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25. The method of claim 20 wherein said step of assigning, reusing and borrowing is based on prioritization rules.

5 26. The method of claim 25 wherein the prioritization rules include dynamic load and capacity constraints of candidate cells that frequencies are being taken from.

10 27. The method of claim 20 wherein a user positioned within the first central portion can be assigned, reuse and/or borrow use any of the respective set of frequencies associated with the at least one second satellite spot beam.

15 28. The method of claim 20 wherein a user positioned within the first central portion can be assigned, reuse and/or borrow use any of the respective set of frequencies associated with any communication areas adjacent the first satellite spot beam.

20 29. The method of claim 20 wherein a user positioned within a subarea not sharing at least a portion of a common boundary with the second communications area can be assigned, reuse and/or borrow any of the second set

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of frequencies associated with the second communications area.

30. The method of claim 20 wherein the predetermined criteria is at least one of load balancing, maintaining a reserve of frequencies, and received signal strength interference.

31. The method of claim 20 further comprising the steps of:

configuring a fourth communications area within the second communications area having a fourth set of frequencies associated therewith; and
at least one of assigning, reusing and borrowing, by the fourth communications area, at least one of the first set of frequencies and the frequencies used in the second central portion, responsive to predetermined criteria associated with the fourth set of frequencies, including at least one of assigning, reusing and borrowing at least one of the first set of frequencies when the first set of frequencies are at least substantially geographically distant from the second communications area.

32. The method of claim 20 wherein the first central portion and the second central portion comprise approximately twenty five percent of the area covered by the first communications area and the second communications area, respectively.

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33. The method of claim 20 wherein the first and second set of frequencies comprise a plurality of paired uplink and downlink frequencies, wherein a downlink frequency of a frequency set is used in a first subarea of the first communications area, and wherein a corresponding one of the uplink frequencies is reused in a second subarea of the first communications area.

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15 34. The method of claim 20 wherein the area of coverage of a communications area comprises an area having a radius substantially equal to a distance from a center of the communications area having a substantially maximum signal strength to a distance from the center of the communications area where the signal strength of the communications area is attenuated by approximately 3 dB.

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35. The method of claim 20 wherein an area of coverage of at least one of a spot beam and a terrestrial cell comprises an area corresponding to a bit error rate in the range of at least one of 10^{-2} to 10^{-3} for voice and 10^{-5} to 10^{-6} for data.

36. A method of at least one of assigning and reusing frequencies between one or more communication systems, comprising the steps of:

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configuring a first satellite spot beam having a first set of frequencies associated therewith and comprising a first substantially central portion and a first plurality of subareas, each of the first plurality of subareas extending substantially from a periphery of the first substantially central portion to substantially near a circumference of the first satellite spot beam;

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configuring a second satellite spot beam having a second set of frequencies associated therewith and comprising a second substantially central portion and a second plurality of subareas, each of the second plurality of subareas extending substantially from a periphery of the central

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portion to substantially near a circumference of the second satellite spot beam; configuring at least one terrestrial cell that at least partially overlaps the first satellite spot beam having a third set of frequencies associated therewith; and at least one of assigning, reusing and borrowing, by the second satellite spot beam, at least one of a portion of the third set of frequencies responsive to predetermined criteria, including at least one of assigning, reusing and borrowing at least one of the third set of frequencies associated with the at least one terrestrial cell when the terrestrial cell is at least substantially geographically distant from the second set of frequencies.

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37. A method of at least one of assigning and reusing frequencies between one or more communication systems, comprising the steps of:

20 configuring a first satellite spot beam having a first set of frequencies associated therewith and comprising a first substantially central portion and a first plurality of subareas, each of the first plurality of subareas extending substantially

from a periphery of the first substantially central portion to substantially near a circumference of the first satellite spot beam;

configuring a second satellite spot beam having a 5 second set of frequencies associated therewith;

configuring at least one terrestrial cell that at least partially overlaps the first satellite spot beam having a third set of frequencies associated therewith; and

at least one of assigning, reusing and borrowing, by 10 the terrestrial cell, at least one of a portion of the second set of frequencies and a portion of the first set of frequencies used in the first central portion, responsive to predetermined criteria associated with the third set of frequencies, 15 including at least one of assigning, reusing and borrowing at least one of the second set of frequencies when the second set of frequencies are at least substantially geographically distant from the terrestrial cell.

38. The method of claim 37 wherein the first plurality of subareas are substantially equal sized.

39. The method of claim 37 wherein the second set of frequencies are substantially distant from the first satellite spot beam when they are at least one of assigned, reused and borrowed for use in those first plurality of subareas not sharing a common boundary with the second satellite spot beam.

40. The method of claim 37 wherein the first set of frequencies used in the first central portion comprise at least one of those frequency sets respectively associated with one or more satellite spot beams directly adjacent to the first satellite spot beam.

41. The method of claim 37 wherein said step of assigning, reusing and borrowing is based on prioritization rules.

42. The method of claim 41 wherein the prioritization rules include dynamic load and capacity constraints of candidate cells that frequencies are being taken from.

43. The method of claim 37 wherein a user positioned within the first central portion can be assigned, reuse and/or borrow use any of the respective set of

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frequencies associated with the second satellite spot beam.

44. The method of claim 37 wherein a subscriber
5 terminal positioned within the first central portion can
be assigned, reuse and/or borrow use any of the
respective set of frequencies associated with any spot
beams adjacent the first satellite spot beam.

10 45. The method of claim 37 wherein a subscriber
terminal positioned within a subarea of the first spot
beam not sharing at least a portion of a common boundary
with the second satellite spot beam can be assigned,
reuse and/or borrow any of the second set of frequencies
15 associated with the second satellite spot beam.

20 46. The method of claim 37 wherein the predetermined
criteria is at least one of load balancing, maintaining
a reserve of frequencies, and received signal strength
interference.

47. The method of claim 37 further comprising the
steps of:

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configuring a second terrestrial cell that at least partially overlaps the second satellite spot beam having a fourth set of frequencies associated therewith; and

5 at least one of assigning, reusing and borrowing, by the second terrestrial cell, at least one of the first set of frequencies and the frequencies used in the second central portion, responsive to predetermined criteria associated with the fourth set of frequencies, including at least one of assigning, reusing and borrowing at least one of the first set of frequencies when the first set of frequencies are at least substantially geographically distant from the second terrestrial cell.

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of the first spot beam, and wherein a corresponding one of the uplink frequencies is reused in a second subarea of the first spot beam.

5 50. The method of claim 37 wherein the area of coverage of a spot beam comprises an area having a radius substantially equal to a distance from a center of the spot beam having a substantially maximum signal strength to a distance from the center of the spot beam where the signal strength of the spot beam is attenuated by approximately 3 dB.

10 10 51. The method of claim 37 wherein an area of coverage of at least one of a spot beam and a terrestrial cell comprises an area corresponding to a bit error rate in the range of at least one of 10^{-2} to 10^{-3} for voice and 10^{-5} to 10^{-6} for data.

15 15 52. A method of at least one of assigning and reusing frequencies between one or more communication systems, comprising the steps of:

20 20 configuring a first satellite spot beam having a first set of frequencies associated therewith and comprising a first plurality of subareas, each of

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the first plurality of subareas extending from a substantially center area of the first satellite spot beam to substantially near a circumference of the first satellite spot beam in a fan-like manner thereby forming the first plurality of subareas;

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configuring a second satellite spot beam having a second set of frequencies associated therewith;

configuring at least one terrestrial cell that at

least partially overlaps the first satellite spot beam having a third set of frequencies associated therewith; and

at least one of assigning, reusing and borrowing, by the at least one terrestrial cell, at least one of a portion of the second set of frequencies and a portion of the first set of frequencies used in the first central portion, responsive to predetermined criteria associated with the third set of frequencies for communication therewith, including at least one of assigning, reusing and borrowing at least one of the second set of frequencies when the second set of frequencies are at least substantially geographically distant from the first spot beam.

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53. The method of claim 52 wherein the first plurality of subareas are substantially equal sized.

5 54. The method of claim 52 wherein the second set of frequencies are substantially distant from the second satellite spot beam when they are at least one of assigned, reused and borrowed for use in those first plurality of subareas not sharing a common boundary with the second satellite spot beam.

10 55. The method of claim 52 wherein the first set of frequencies used in the first central portion comprise those frequency sets respectively associated with at least one of the satellite spot beams directly adjacent to the first satellite spot beam.

15 56. The method of claim 52 wherein said step of assigning, reusing and borrowing is based on prioritization rules.

20 57. The method of claim 56 wherein the prioritization rules include dynamic load and capacity constraints of candidate cells that frequencies are being taken from.

58. The method of claim 56 wherein the prioritization rules further include at least one of signal strength and quality of service.

5 59. The method of claim 52 wherein a user positioned
within the first central portion can be assigned, reuse
and/or borrow use any of the respective set of
frequencies associated with the second satellite spot
beam.

60. The method of claim 52 wherein a user positioned within the first central portion can be assigned, reuse and/or borrow use any of the respective set of frequencies associated with any spot beams adjacent the first satellite spot beam.

61. The method of claim 52 wherein a user positioned
within a subarea not sharing at least a portion of a
common boundary with the second satellite spot beam can
be assigned, reuse and/or borrow any of the second set
of frequencies associated with the second satellite spot
beam.

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62. The method of claim 52 wherein the predetermined criteria comprise at least one of load balancing, maintaining a reserve of frequencies, and received signal strength interference.

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63. The method of claim 52 further comprising the steps of:

configuring a terrestrial cell that at least partially overlaps the second satellite spot beam having a fourth set of frequencies associated therewith; and

at least one of assigning, reusing and borrowing, by the terrestrial cell, at least one of the first set of frequencies and the frequencies used in the second central portion, responsive to predetermined criteria associated with the fourth set of frequencies, including at least one of assigning, reusing and borrowing at least one of the first set of frequencies when the first set of frequencies are at least substantially geographically distant from the terrestrial cell.

64. The method of claim 52 wherein the first and second set of frequencies comprise a plurality of paired uplink and downlink frequencies.

5 65. The method of claim 64 wherein a downlink frequency of a frequency set is used in a first subarea of the first spot beam, and wherein a corresponding one of the uplink frequencies is used in a second subarea of the first spot beam.

10 66. The method of claim 52 wherein the area of coverage of a spot beam comprises an area having a radius substantially equal to a distance from a center of the spot beam having a substantially maximum signal strength to a distance from the center of the spot beam where the signal strength of the spot beam is attenuated by approximately 3 dB.

15 67. The method of claim 52 wherein an area of coverage of at least one of a spot beam and a terrestrial cell comprises an area corresponding to a bit error rate in the range of 10^{-2} to 10^{-3} for voice and 10^{-5} to 10^{-6} for data.

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68. A system for at least one of assigning and reusing frequencies between one or more communication systems, comprising:

at least one satellite capable of configuring: a) a first spot beam having a first set of frequencies associated therewith, the first spot beam comprising a first substantially central portion and a first plurality of subareas, each of the first plurality of subareas extending substantially from a periphery of the first substantially central portion to substantially near a circumference of the first satellite spot beam, and b) a second satellite spot beam having a second set of frequencies associated therewith, the second spot beam comprising a second substantially central portion and a second plurality of subareas, each of the second plurality of subareas extending substantially from a periphery of the second substantially central portion to substantially near a circumference of the second satellite spot beam;

a terrestrial base station positioned within the first satellite spot beam for configuring a terrestrial cell having at least partially overlapping coverage with the first spot beam, the

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terrestrial cell having a third set of frequencies associated therewith and an area coverage at least partially overlapping with an area of coverage associated with the first spot beam;

5 a first subscriber terminal positioned within the terrestrial base station area of coverage; and
a network operations center (NOC) for at least one of assigning, reusing and borrowing, by the terrestrial base station and for use by said first subscriber terminal in communicating with at least one of a second subscriber terminal and other communications device, at least one of a portion of the second set of frequencies and a portion of the first set of frequencies used in the first central portion, responsive to predetermined criteria associated with the third set of frequencies, including at least one of assigning, reusing and borrowing at least one of the second set of frequencies when the second set of frequencies are at least substantially geographically distant from the second satellite spot beam.

69. The system of claim 68 wherein the first plurality of subareas are substantially equal sized and

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having a first size, and the second plurality of subareas are substantially and having a second size.

5 70. The system of claim 69 wherein the first size and the second size are approximately equal.

10 71. The system of claim 68 wherein the second set of frequencies are substantially distant from the second satellite spot beam when they are at least one of assigned, reused and borrowed for use by subscriber terminals positioned in those first plurality of subareas not sharing a common boundary with the second satellite spot beam.

15 72. The system of claim 68 wherein the first set of frequencies used by subscriber terminals positioned in the first central portion comprise at least one of those frequency sets respectively associated with one or more satellite spot beams directly adjacent to the first satellite spot beam.

20 73. The system of claim 68 wherein at least one of assigning, reusing and borrowing is based on prioritization rules.

74. The system of claim 73 wherein the prioritization rules include dynamic load and capacity constraints of cells that frequencies are taken from.

5 75. The system of claim 68 wherein a subscriber terminal positioned within the first central portion can be assigned, reuse and/or borrow any of the respective set of frequencies associated with the at least one second satellite spot beam.

10 76. The system of claim 68 wherein a subscriber terminal positioned within the first central portion can be assigned, reuse and/or borrow use any of the respective set of frequencies associated with any spot beam directly adjacent the first satellite spot beam.

15 77. The system of claim 68 wherein a subscriber terminal positioned within a subarea of the first spot beam not sharing at least a portion of a common boundary with the second satellite spot beam can be assigned, reuse and/or borrow any of the second set of frequencies associated with the second satellite spot beam.

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78. The system of claim 68 wherein the predetermined criteria is at least one of load balancing, maintaining a reserve of frequencies, and received signal strength interference.

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79. The system of claim 68 further comprising:
a second terrestrial base station positioned within
the second satellite spot beam and having at least
partially overlapping coverage with the first spot
beam, for configuring at least one terrestrial cell
therein, wherein the terrestrial cell has a fourth
set of frequencies associated therewith; and
at least one of assigning, reusing and borrowing, by
said second terrestrial base station, at least one
of the first set of frequencies and the frequencies
used in the second central portion, responsive to
predetermined criteria associated with the fourth
set of frequencies for establishing communication
between the second subscriber unit positioned
within an area of coverage of said second base
station and at least one of the first subscriber
terminal and other communications device, including
at least one of assigning, reusing and borrowing at
least one of the first set of frequencies when the

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first set of frequencies are at least substantially geographically distant from the second satellite spot beam.

5 80. The system of claim 68 wherein the first central portion and the second central portion comprise approximately twenty five percent of the area covered by the first satellite spot beam and the second satellite spot beam, respectively.

10 81. The system of claim 68 wherein the first and second set of frequencies comprise a plurality of paired uplink and downlink frequencies.

15 82. The system of claim 81 wherein a downlink frequency of a frequency set is used in a first subarea of the first spot beam, and wherein a corresponding one of the uplink frequencies is reused in a second subarea of the first spot beam.

20 83. The system of claim 68 wherein the area of coverage of a spot beam comprises an area having a radius substantially equal to a distance from a center of the spot beam having a substantially maximum signal

strength to a distance from the center of the spot beam where the signal strength of the spot beam is attenuated by approximately 3 dB.

5 84. The system of claim 68 wherein an area of coverage of at least one of a spot beam and a terrestrial cell comprises an area corresponding to a bit error rate in the range of 10^{-2} to 10^{-3} for voice and 10^{-5} to 10^{-6} for data.

10 85. The system of claim 68 wherein the number of subareas is equal to a number of spot beams comprising a cluster minus one.

15 86. A system for making a telephone call using a satellite-terrestrial communications system that at least one of assigns and reuses frequencies between a first satellite spot beam and a second satellite spot beam, comprising:

20 a subscriber terminal for dialing a telephone number to communicate with at least a second communications device;

 a first terrestrial cell having said subscriber terminal positioned therein;

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at least one satellite for configuring: a) a first satellite spot beam associated with said first terrestrial cell and having a first set of frequencies associated therewith, the first satellite spot beam comprising a first substantially central portion and a first plurality of subareas, each of the first plurality of subareas extending substantially from a periphery of the first substantially central portion to substantially near a circumference of the first satellite spot beam, and b) a second satellite spot beam having the second communications device positioned therein and a second set of frequencies associated therewith; and

a network operations controller that establishes a connection between the subscriber terminal and at least the second communications device, by at least one of assigning, reusing and borrowing, by the first spot beam, at least one of the second set of frequencies, responsive to predetermined criteria including at least one of assigning, reusing and borrowing at least one of the second set of frequencies when the subscriber terminal is

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substantially geographically distant from the second satellite spot beam.

87. A system for use in at least one of assigning and
5 reusing frequencies, comprising:

at least a first satellite for: a) configuring a first communications area having a first set of frequencies associated therewith, the communications area comprising a first substantially central portion and a first plurality of subareas, each of the first plurality of subareas extending substantially from a periphery of the first substantially central portion to substantially near a circumference of the first communications area, and for b) configuring a second communications area having a second set of frequencies associated therewith and comprising a second substantially central portion and a second plurality of subareas, each of the second plurality of subareas extending substantially from a periphery of the central portion to substantially near a circumference of the second communications area;

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a terrestrial base station positioned within the first communications area and having at least partially overlapping coverage with the first communications area, that configures at least a third communications area within the first communications area, the third communications area having a third set of frequencies associated therewith; and

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a network operations controller that at least one of assigns, reuses and borrows, by said terrestrial base station, at least one of a portion of the second set of frequencies and a portion of the first set of frequencies used in the first central portion for facilitating communications between a subscriber terminal positioned within the first communications area and a second communications device, and responsive to predetermined criteria associated with the third set of frequencies, including at least one of assigning, reusing and borrowing at least one of the second set of frequencies when the second set of frequencies are at least substantially geographically distant from the first satellite spot beam.

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88. The system of claim 87 wherein the first plurality of subareas are substantially equal sized and having a first size and the second plurality of subareas are substantially equal sized and having a second size.

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89. The system of claim 88 wherein the first size and the second size are approximately equal.

90. The system of claim 87 wherein the second set of frequencies are substantially distant from the second communications area when they are at least one of assigned, reused and borrowed for use in those first plurality of subareas not sharing a common boundary with the second communications area.

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91. The system of claim 87 wherein the first set of frequencies used in the first central portion comprise those frequency sets respectively associated with communication areas external to and directly adjacent to the first communications area.

92. The system of claim 87 wherein the assigning, reusing and borrowing is based on prioritization rules.

93. The system of claim 92 wherein the prioritization rules comprise dynamic load and capacity constraints of candidate cells that frequencies are being taken from.

5 94. The system of claim 87 wherein a user positioned within the first central portion can be assigned, reuse and/or borrow use any of the respective set of frequencies associated with the second communications area.

10 95. The system of claim 87 wherein when the subscriber terminal is positioned within the first central portion it can be assigned, reuse and/or borrow any of the respective set of frequencies associated with any communication areas adjacent the first communications area.

15 96. The system of claim 87 wherein when the subscriber terminal is positioned within a subarea of the first communications area not sharing at least a portion of a common boundary with the second communications area it can be assigned, reuse and/or borrow any of the second set of frequencies associated with the second communications area.

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97. The system of claim 87 wherein the predetermined criteria is at least one of load balancing, maintaining a reserve of frequencies, and received signal strength interference.

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98. The system of claim 87, further comprising:
a second terrestrial base station positioned within
the second communications area and having at least
partially overlapping coverage with the second
communications area, wherein the second
communications area comprises at least one
terrestrial cell within the second communications
area, and wherein said second terrestrial base
station has a fourth set of frequencies associated
therewith; and
at least one of assigning, reusing and borrowing, by
said second terrestrial base station, at least one
of the first set of frequencies and the frequencies
used in the second central portion, responsive to
predetermined criteria associated with the fourth
set of frequencies, for establishing communication
between a second subscriber unit positioned within
an area covered by said second terrestrial base
station and at least one of the first subscriber

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unit and the second communication device, including at least one of assigning, reusing and borrowing at least one of the first set of frequencies when the first set of frequencies are at least substantially geographically distant from the second terrestrial base station.

99. The system of claim 87 wherein the first central portion and the second central portion comprise approximately twenty five percent of the area covered by the first communications area and the second communications area, respectively.

100. The system of claim 87 wherein the first and second set of frequencies comprise a plurality of paired uplink and downlink frequencies, wherein a downlink frequency of a frequency set is used in a first subarea of the first communications area, and wherein a corresponding one of the uplink frequencies is reused in a second subarea of the first communications area.

101. The system of claim 87 wherein the area of coverage of a communications area comprises an area having a radius substantially equal to a distance from a

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center of the communications area having a substantially maximum signal strength to a distance from the center of the communications area where the signal strength of the communications area is attenuated by approximately 3 dB.

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102. The system of claim 87 wherein an area of coverage of at least one of a spot beam and a terrestrial cell comprises an area corresponding to a bit error rate in the range of 10^{-2} to 10^{-3} for voice and 10^{-5} to 10^{-6} for data.

103. A system for at least one of assigning and reusing frequencies between a plurality of communication systems, comprising:

15 at least one satellite capable of: a) configuring a first satellite spot beam having a first set of frequencies associated therewith and comprising a first substantially central portion and a first plurality of subareas, each of the first plurality of subareas extending substantially from a periphery of the first substantially central portion to substantially near a circumference of the first satellite spot beam, and b) configuring a second satellite spot beam having a second set of

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5 frequencies associated therewith and comprising a second substantially central portion and a second plurality of subareas, each of the second plurality of subareas extending substantially from a periphery of the central portion to substantially near a circumference of the second satellite spot beam;

10 a terrestrial base station positioned within the first satellite spot beam and having at least partially overlapping coverage with the first spot beam, for configuring at least one terrestrial cell within the first satellite spot beam having a third set of frequencies associated therewith and having an area of coverage at least partially overlapping with the first satellite spot beam; and

15 a network operations controller for at least one of assigning, reusing and borrowing, by the second satellite spot beam, at least one of a portion of the third set of frequencies responsive to predetermined criteria, including at least one of assigning, reusing and borrowing at least one of the third set of frequencies associated with the at least one terrestrial cell when the portion is at

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least substantially geographically distant from the second set of frequencies.

104. A system of at least one of assigning and
5 reusing frequencies between a plurality of communication systems, comprising:

a first satellite capable of: a) configuring a first satellite spot beam having a first set of frequencies associated therewith and comprising a first substantially central portion and a first plurality of subareas, each of the first plurality of subareas extending substantially from a periphery of the first substantially central portion to substantially near a circumference of the first satellite spot beam, and b) configuring a second satellite spot beam having a second set of frequencies associated therewith;

a terrestrial base station positioned within the first satellite spot beam and having at least partially overlapping coverage with the first spot beam, for configuring at least one terrestrial cell within the first satellite spot beam, the terrestrial cell having a third set of frequencies associated therewith and having an area of coverage

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at least partially overlapping with an area of coverage of the first satellite spot beam; and a network operations controller for at least one of assigning, reusing and borrowing, by the 5 terrestrial base station for use in establishing communications between a first subscriber terminal positioned within an area of coverage of said terrestrial base station and at least one of a second subscriber terminal and communications device, at least one of a portion of the second set 10 of frequencies and a portion of the first set of frequencies used in the first central portion, responsive to predetermined criteria associated with the third set of frequencies, including at least one of assigning, reusing and borrowing at 15 least one of the second set of frequencies when the second set of frequencies are at least substantially geographically distant from the first satellite spot beam.

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105. The system of claim 104 wherein the first plurality of subareas are substantially equal sized.

106. The system of claim 104 wherein the second set
of frequencies are substantially distant from the second
satellite spot beam when they are at least one of
assigned, reused and borrowed for use in those first
5 plurality of subareas not sharing a common boundary with
the second satellite spot beam.

107. The system of claim 104 wherein the first set of
frequencies used in the first central portion comprise
10 those frequency sets respectively associated with
satellite spot beams directly adjacent to the first
satellite spot beam.

15 108. The system of claim 104 wherein said step of
assigning, reusing and borrowing is based on
prioritization rules.

20 109. The system of claim 108 wherein the
prioritization rules include dynamic load and capacity
constraints of candidate cells that frequencies are
being taken from.

110. The system of claim 104 wherein a subscriber
terminal positioned within the first central portion can

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be assigned, reuse and/or borrow any of the respective set of frequencies associated with the second satellite spot beam.

5 111. The system of claim 104 wherein a subscriber terminal positioned within the first central portion can be assigned, reuse and/or borrow any of the respective set of frequencies associated with any spot beams adjacent the first satellite spot beam.

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112. The system of claim 104 wherein a subscriber terminal positioned within a subarea not sharing at least a portion of a common boundary with the second satellite spot beam can be assigned, reuse and/or borrow any of the second set of frequencies associated with the second satellite spot beam.

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20 113. The system of claim 104 wherein the predetermined criteria is at least one of load balancing, maintaining a reserve of frequencies, and received signal strength interference.

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114. The system of claim 104 further comprising:
a second terrestrial base station positioned within
the second satellite spot beam and having at least
partially overlapping coverage with the second spot
beam, wherein the second satellite spot beam
5 further comprises at least one terrestrial cell
having a fourth set of frequencies associated
therewith,

wherein said network operations controller
facilitates at least one of assigning, reusing and
borrowing, by said second terrestrial base station
for use with a second subscriber terminal
positioned within an area covered by said second
terrestrial base station, at least one of the first
15 set of frequencies and the frequencies used in the
second central portion, responsive to predetermined
criteria associated with the fourth set of
frequencies for establishing communication between
the second subscriber terminal and at least one of
the first subscriber terminal and communications
20 device, including at least one of assigning,
reusing and borrowing at least one of the first set
of frequencies when the first set of frequencies

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are at least substantially geographically distant from the second satellite spot beam.

115. The system of claim 104 wherein the first
5 central portion comprises approximately twenty five percent of the area covered by the first satellite spot beam.

10 116. The system of claim 104 wherein the first and second set of frequencies comprise a plurality of paired uplink and downlink frequencies, wherein a downlink frequency of a frequency set is used in a first subarea of the first spot beam, and wherein a corresponding one of the uplink frequencies is reused in a second subarea 15 of the first spot beam.

117. The system of claim 104 wherein an area of coverage of at least one of a spot beam and a terrestrial cell comprises an area corresponding to a bit error rate in the range of 10^{-2} to 10^{-3} for voice and 20 10^{-5} to 10^{-6} for data.

118. The system of claim 104 wherein the area of coverage of a spot beam comprises an area having a

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radius substantially equal to a distance from a center of the spot beam having a substantially maximum signal strength to a distance from the center of the spot beam where the signal strength of the spot beam is attenuated by approximately 3 dB.

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119. A system of at least one of assigning and reusing frequencies between a plurality of communication systems, comprising:

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a first satellite capable of: a) configuring a first satellite spot beam having a first set of frequencies associated therewith and comprising a first plurality of subareas, each of the first plurality of subareas extending from a substantially center area of the first satellite spot beam to substantially near a circumference of the first satellite spot beam in a fan-like manner thereby forming the first plurality of subareas, and b) configuring a second satellite spot beam having a second set of frequencies associated therewith;

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a terrestrial base station positioned within the first satellite spot beam and having at least partially overlapping coverage with the first spot

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beam, for configuring a terrestrial cell, the terrestrial cell having a third set of frequencies associated therewith and having an area of coverage at least partially overlapping with an area of coverage associated with the first spot beam; and a network controller for at least one of assigning, reusing and borrowing, by said terrestrial base station and for use by a first subscriber terminal in communicating with at least one of a second subscriber terminal or communications device, at least one of a portion of the second set of frequencies and a portion of the first set of frequencies used in the first central portion, responsive to predetermined criteria associated with the third set of frequencies, including at least one of assigning, reusing and borrowing at least one of the second set of frequencies when the second set of frequencies are at least substantially geographically distant from the first satellite spot beam.

120. The system of claim 119 wherein the first plurality of subareas are substantially equal sized.

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121. The system of claim 119 wherein the second set
of frequencies are substantially distant from the second
satellite spot beam when they are at least one of
assigned, reused and borrowed for use in those first
5 plurality of subareas not sharing a common boundary with
the second satellite spot beam.

122. The system of claim 119 wherein the assigning,
reusing and borrowing is based on prioritization rules.

10 123. The system of claim 122 wherein the
prioritization rules include dynamic load and capacity
constraints of candidate cells that frequencies are
being taken from.

15 124. The system of claim 119 wherein a subscriber
terminal positioned within a subarea not sharing at
least a portion of a common boundary with the second
satellite spot beam can be assigned, reuse and/or borrow
20 any of the second set of frequencies associated with the
second satellite spot beam.

125. The system of claim 119 wherein the
predetermined criteria is at least one of load

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balancing, maintaining a reserve of frequencies, and received signal strength interference.

126. The system of claim 119 further comprising:

5 a second terrestrial base station positioned within the second satellite spot beam and having at least partially overlapping coverage with the second spot beam, and associated with a terrestrial cell having a fourth set of frequencies associated therewith;
10 and

at least one of assigning, reusing and borrowing, by said second terrestrial base station, at least one of the first set of frequencies and the frequencies used in spot beams adjacent to the second spot beam, responsive to predetermined criteria
15 associated with the fourth set of frequencies, for establishing communication between a second subscriber terminal positioned within the area of coverage of said second terrestrial base station
20 and at least one of a subscriber terminal and communications device, including at least one of assigning, reusing and borrowing at least one of the first set of frequencies when the first set of frequencies are at least substantially

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geographically distant from the second satellite spot beam.

127. The system of claim 119 wherein the first and
5 second frequencies comprise a plurality of paired uplink and downlink frequencies, wherein one of the frequency sets is used in a first subarea of the first spot beam, and wherein a corresponding one of the uplink frequencies is reused in a second subarea of the first spot beam.
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128. The system of claim 119 wherein an area of coverage of at least one of a spot beam and a terrestrial cell comprises an area corresponding to a bit error rate in the range of 10^{-2} to 10^{-3} for voice and
15 10^{-5} to 10^{-6} for data.

129. The system of claim 119 wherein the area of coverage of a spot beam comprises an area having a radius substantially equal to a distance from a center of the spot beam having a substantially maximum signal strength to a distance from the center of the spot beam where the signal strength of the spot beam is attenuated by approximately 3 dB.
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130. A system for at least one of assigning and reusing frequencies between one or more communication systems, comprising:

means for configuring: a) a first spot beam having a first set of frequencies associated therewith, the first spot beam comprising a first substantially central portion and a first plurality of subareas, each of the first plurality of subareas extending substantially from a periphery of the first substantially central portion to substantially near a circumference of the first satellite spot beam, and b) a second satellite spot beam having a second set of frequencies associated therewith, the second spot beam comprising a second substantially central portion and a second plurality of subareas, each of the second plurality of subareas extending substantially from a periphery of the second central portion to substantially near a circumference of the second satellite spot beam; means positioned within the first satellite spot beam for configuring a terrestrial cell having at least partially overlapping coverage with the first spot beam, the terrestrial cell having a third set of frequencies associated therewith and an area

coverage at least partially overlapping with an area of coverage associated with the first spot beam;

a first subscriber terminal positioned within the 5 terrestrial base station area of coverage; and means for at least one of assigning, reusing and borrowing, by the terrestrial base station and for use by said first subscriber terminal in communicating with at least one of a second subscriber terminal and other communications 10 device, at least one of a portion of the second set of frequencies and a portion of the first set of frequencies used in the first central portion, responsive to predetermined criteria associated 15 with the third set of frequencies, including at least one of assigning, reusing and borrowing at least one of the second set of frequencies when the second set of frequencies are at least substantially geographically distant from the 20 second satellite spot beam.

131. A system for making a telephone call using a satellite-terrestrial communications system that at least one of assigns and reuses frequencies between a

first satellite spot beam and a second satellite spot beam, comprising:

a subscriber terminal for dialing a telephone number to communicate with at least a second 5 communications device;

a first terrestrial cell having said subscriber terminal positioned therein;

means for configuring: a) a first satellite spot beam associated with said first terrestrial cell, having a first set of frequencies associated therewith, and having at least partially overlapping coverage with the first terrestrial cell, the first satellite spot beam comprising a first substantially central portion and a first plurality of subareas, each of the first plurality of subareas extending substantially from a periphery of the first substantially central portion to substantially near a circumference of said first satellite spot beam, and b) a second satellite spot beam having the second communications device positioned therein and a second set of frequencies associated therewith; and means for establishing a connection between said subscriber terminal and at least the second

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communications device, by at least one of assigning, reusing and borrowing, by the first spot beam, at least one of the second set of frequencies, responsive to predetermined criteria including at least one of assigning, reusing and borrowing at least one of the second set of frequencies when the subscriber terminal is substantially geographically distant from the second satellite spot beam.

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132. A system for use in at least one of assigning and reusing frequencies, comprising:
means for configuring: a) a first communications area having a first set of frequencies associated therewith, the communications area comprising a first substantially central portion and a first plurality of subareas, each of the first plurality of subareas extending substantially from a periphery of the first substantially central portion to substantially near a circumference of the first communications area, and b) a second communications area having a second set of frequencies associated therewith and comprising a second substantially central portion and a second

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plurality of subareas, each of the second plurality of subareas extending substantially from a periphery of the central portion to substantially near a circumference of the second communications area;

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means positioned within the first satellite spot beam for configuring at least a third communications area within the first communications area, the third communications area having a third set of frequencies associated therewith and having at least partially overlapping coverage with the first spot beam; and

means for at least one of assigning, reusing and borrowing, by said terrestrial base station, at least one of a portion of the second set of frequencies and a portion of the first set of frequencies used in the first central portion for facilitating communications between a subscriber terminal positioned within the first spot beam and a second communications device, and responsive to predetermined criteria associated with the third set of frequencies, including at least one of assigning, reusing and borrowing at least one of the second set of frequencies when the second set

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of frequencies are at least substantially geographically distant from the first satellite spot beam.

5 133. A system for at least one of assigning and reusing frequencies between a plurality of communication systems, comprising:

means for: a) configuring a first satellite spot beam having a first set of frequencies associated therewith and comprising a first substantially central portion and a first plurality of subareas, each of the first plurality of subareas extending substantially from a periphery of the first substantially central portion to substantially near a circumference of the first satellite spot beam, and b) configuring a second satellite spot beam having a second set of frequencies associated therewith and comprising a second substantially central portion and a second plurality of subareas, each of the second plurality of subareas extending substantially from a periphery of the central portion to substantially near a circumference of the second satellite spot beam;

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means positioned within the first satellite spot beam
for configuring at least one terrestrial cell
within the first satellite spot beam having a third
set of frequencies associated therewith and having
an area of coverage at least partially overlapping
with the first satellite spot beam; and
means for at least one of assigning, reusing and
borrowing, by the second satellite spot beam, at
least one of a portion of the third set of
frequencies responsive to predetermined criteria,
including at least one of assigning, reusing and
borrowing at least one of the third set of
frequencies associated with the at least one
terrestrial cell when the portion is at least
substantially geographically distant from the
second set of frequencies.

134. A system of at least one of assigning and
reusing frequencies between a plurality of communication
systems, comprising:

means for: a) configuring a first satellite spot beam
having a first set of frequencies associated
therewith and comprising a first substantially
central portion and a first plurality of subareas,

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each of the first plurality of subareas extending substantially from a periphery of the first substantially central portion to substantially near a circumference of the first satellite spot beam, and b) configuring a second satellite spot beam having a second set of frequencies associated therewith;

means positioned within the first satellite spot beam for configuring at least one terrestrial cell within the first satellite spot beam, the terrestrial cell having a third set of frequencies associated therewith and having an area of coverage at least partially overlapping with an area of coverage of the first satellite spot beam; and means for at least one of assigning, reusing and borrowing, by the terrestrial base station for use in establishing communications between a first subscriber terminal positioned within an area of coverage of said terrestrial base station and at least one of a second subscriber terminal and communications device, at least one of a portion of the second set of frequencies and a portion of the first set of frequencies used in the first central portion, responsive to predetermined criteria

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associated with the third set of frequencies, including at least one of assigning, reusing and borrowing at least one of the second set of frequencies when the second set of frequencies are at least substantially geographically distant from the first satellite spot beam.

135. A system of at least one of assigning and reusing frequencies between a plurality of communication systems, comprising:

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means for: a) configuring a first satellite spot beam having a first set of frequencies associated therewith and comprising a first plurality of subareas, each of the first plurality of subareas extending from a substantially center area of the first satellite spot beam to substantially near a circumference of the first satellite spot beam in a fan-like manner thereby forming the first plurality of subareas, and b) configuring a second satellite spot beam having a second set of frequencies associated therewith;

means positioned within the first satellite spot beam for configuring a terrestrial cell, the terrestrial cell having a third set of frequencies associated

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therewith and having an area of coverage at least partially overlapping with an area of coverage associated with the first spot beam; and means for at least one of assigning, reusing and borrowing, by said terrestrial base station and for use by a first subscriber terminal in communicating with at least one of a second subscriber terminal or communications device, at least one of a portion of the second set of frequencies and a portion of the first set of frequencies used in the first central portion, responsive to predetermined criteria associated with the third set of frequencies, including at least one of assigning, reusing and borrowing at least one of the second set of frequencies when the second set of frequencies are at least substantially geographically distant from the first satellite spot beam.

20 136. A method of at least one of assigning and reusing frequencies between one or more communication systems, comprising the steps of:

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configuring a first satellite spot beam having a
first set of frequencies associated therewith and
comprising a first substantially central portion;
configuring a second satellite spot beam having a
second set of frequencies associated therewith and
comprising a second substantially central portion
configuring at least one terrestrial cell within the
first satellite spot beam having a third set of
frequencies associated therewith and having at
least partially overlapping coverage with the first
spot beam; and
at least one of assigning, reusing and borrowing, by
the terrestrial system, at least one of a portion
of the second set of frequencies and a portion of
the first set of frequencies used in the first
central portion, responsive to predetermined
criteria associated with the third set of
frequencies, including at least one of assigning,
reusing and borrowing at least one of the second
set of frequencies when the second set of
frequencies are at least substantially
geographically distant from the first satellite
spot beam.

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137. The method of claim 136 wherein the second set of frequencies are substantially distant from the first satellite spot beam when they are used in subareas of the second spot beam that do not share a common boundary
5 with the first satellite spot beam.

138. The method of claim 136 wherein the first set of frequencies used in the first central portion comprise at least one of those frequency sets respectively
10 associated with satellite spot beams directly adjacent to the first satellite spot beam.

139. The method of claim 136 wherein said step of assigning, reusing and borrowing is based on
15 prioritization rules.

140. The method of claim 139 wherein the prioritization rules include dynamic load and capacity constraints of cells that frequencies are taken from.
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141. The method of claim 136 wherein a subscriber terminal positioned within the first central portion can be assigned, reuse and/or borrow use any of the

respective set of frequencies associated with the at least one second satellite spot beam.

142. The method of claim 136 wherein a subscriber terminal positioned within the first central portion can be assigned, reuse and/or borrow use any of the respective set of frequencies associated with any spot beams adjacent the first satellite spot beam.

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10 143. The method of claim 136 wherein the predetermined criteria is at least one of load balancing, maintaining a reserve of frequencies, and received signal strength interference.

15 144. The method of claim 136 further comprising the steps of:

20 configuring a second terrestrial cell within the second satellite spot beam having a fourth set of frequencies associated therewith and having at least partially overlapping coverage with the second spot beam; and

at least one of assigning, reusing and borrowing, by the second terrestrial cell, at least one of the first set of frequencies and the frequencies used

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in the second central portion, responsive to predetermined criteria associated with the fourth set of frequencies, including at least one of assigning, reusing and borrowing at least one of the first set of frequencies when the first set of frequencies are at least substantially geographically distant from the second satellite spot beam.

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145. The method of claim 136 wherein the first central portion and the second central portion comprise approximately twenty five percent of the area covered by the first satellite spot beam and the second satellite spot beam, respectively.

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146. The method of claim 136 wherein the first set of frequencies and the second set of frequencies comprise a plurality of paired uplink and downlink frequencies, wherein a downlink frequency of a frequency set is used in the first spot beam, and wherein a corresponding one of the uplink frequencies is reused in the second spot beam.

147. The system of claim 137 wherein an area of coverage of at least one of a spot beam and a terrestrial cell comprises an area corresponding to a bit error rate in the range of 10^{-2} to 10^{-3} for voice and
5 10^{-5} to 10^{-6} for data.

148. The method of claim 136 wherein the area of coverage of a spot beam comprises an area having a radius substantially equal to a distance from a center of the spot beam having a substantially maximum signal strength to a distance from the center of the spot beam where the signal strength of the spot beam is attenuated by approximately 3 dB.

15 149. A method of making a telephone call using a satellite-terrestrial communications system that at least one of assigns and reuses frequencies between a first satellite spot beam and a second satellite spot beam, comprising the steps of:

20 a first user using a subscriber terminal to dial a telephone number within an area of a first terrestrial cell associated with a first satellite spot beam having a first set of frequencies

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associated therewith, the first satellite spot beam comprising a first substantially central portion; determining because of at least one of unavailability of the first set of frequencies or weak signal strength that a connection cannot be established, using the first set of frequencies, with a communications device having the dialed telephone number associated therewith;

configuring a second satellite spot beam having a second set of frequencies associated therewith and having at least partially overlapping coverage with the second spot beam; and establishing a connection between the subscriber terminal and the communications device by at least one of assigning, reusing and borrowing, by the first spot beam, at least one of the second set of frequencies, responsive to predetermined criteria including at least one of assigning, reusing and borrowing at least one of the second set of frequencies when the mobile terminal is substantially geographically distant from the second satellite spot beam.

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150. A satellite-terrestrial communication system using satellite uplink and downlink frequencies, comprising:

a terrestrial system producing a signal at a
5 satellite uplink frequency that is transmitted to a
terrestrial subscriber terminal; and
said terrestrial system receiving a signal at a
satellite downlink frequency that was transmitted
by said terrestrial subscriber terminal.

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151. The satellite-terrestrial communication system according to claim 150 wherein said terrestrial system includes a signal nulling means in the direction of a satellite that produces signals using said uplink and said downlink frequencies.

152. A satellite-terrestrial communication system using satellite uplink and downlink frequencies comprising:

20 a terrestrial subscriber terminal producing a signal at a satellite downlink frequency that is transmitted to a terrestrial system; and

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said terrestrial subscriber terminal receiving a signal at a satellite uplink frequency that was transmitted by said terrestrial system.

5 153. The satellite-terrestrial communications system of claim 152 wherein a satellite ground user using said uplink and downlink frequencies is geographically isolated from said terrestrial subscriber terminal.

10 154. A method of integrating a terrestrial communication system into a satellite communication frequency spectrum comprising the steps of:
producing a signal at a satellite uplink frequency
that is transmitted from a terrestrial system to a
terrestrial user terminal; and
receiving a signal at a satellite downlink frequency
that was produced by said terrestrial user terminal
and transmitted to said terrestrial system.

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